

Hypoglycemia

Heal with a Ketogenic Diet

By Ellen Davis

HYPOGLYCEMIA IS A CONDITION in which the body reacts to a perceived catastrophic drop in blood sugar. I say perceived because when starting a low-carbohydrate ketogenic diet, the blood sugar or glucose readings during a hypoglycemic reaction may measure in the normal range, but still feel like low blood sugar to the person having the reaction.

In my experience, hypoglycemia happens to many people when first beginning a low-carbohydrate ketogenic diet. It may be especially strong in people who have already developed insulin resistance or pre-diabetes from a chronic excess of carbohydrate intake. Mary Vernon, M.D., a physician who treats metabolic syndrome and diabetes patients with a low carbohydrate diet, says there are actually two types of hypoglycemia that patients can experience.

Typical hypoglycemia, the first type, normally happens when most people who have been eating a high-carbohydrate diet drastically reduce carbohydrate intake for the first time. This happens during the first several weeks of carbohydrate reduction because the body has not had time to create the enzymes

or metabolic state to burn internal fat stores for fuel. There is a gap between the amount of carbohydrate available for fuel and the process of accessing fat stores for fuel. The lack of fuel sources results in transient low blood sugar.

Reactive hypoglycemia, the second type, is more of an acute reaction to a very high-carbohydrate meal. For instance, when a person eats two or three glazed donuts, there is a huge spike in blood sugar and insulin. The insulin spike drives blood sugar very low afterward.



Ketosis Caution

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come out of ketosis should resolve the issues, and still allow for the health benefits and weight loss, if desired. However, you should consult your doctor about starting a ketogenic diet if you have any concerns.

“Remember though that most classically trained doctors don’t understand the effect of foods on the body, much less ketogenic diets, so you may get put off with a terrifying ‘danger of ketosis’ sermon. Just remember the doctor is confusing ketosis with ketoacidosis. These are two different conditions.”

See <http://www.ketogenic-diet-resource.com> for answers to many questions about a ketogenic diet plan, including: What are the benefits of a ketogenic diet? How do I start a ketogenic diet plan? Do I need to worry about the “dangers of low carb diets”? What are the side effects of a ketogenic diet?



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The Process of Hypoglycemia

Insulin, a hormone, is secreted from the pancreas in response to eating food, especially foods high in carbohydrates. Its main job is to move the sugar your body makes from the food you eat into your cells so that this sugar can be broken down for energy or stored. Insulin is a very powerful hormone, and it acts very quickly. The amount of insulin your body secretes is closely tied to how much blood sugar is being created from food.

Eating a high-carbohydrate diet over a long period of time will cause

The insulin resistance which develops in response to the chronically high levels of insulin has been shown to increase inflammation and is linked to obesity.

a chronic elevation of your blood sugar, which results in a chronic elevation of your insulin levels. The insulin resistance that develops in response to the chronically high levels of insulin has been shown to increase inflammation¹ and is linked to obesity. When insulin levels are elevated, fat storage is increased, and burning stored fat for fuel is inhibited. It’s a sort of vicious circle—the more carbohydrate eaten, the higher the insulin and the less stored fat can be accessed to fuel the body, so more carbohydrate has to be eaten to provide fuel instead.

One of the benefits of eating a ketogenic diet is its ability to lower your average blood sugar and insulin levels, and allow the body to burn stored fat. However, when first starting the diet, your body might still be in high-carbohydrate/high-insulin mode, and most likely be using carbohydrates for fuel instead of ketones.

For most people, fifty grams or less per day of carbohydrates per day allows the brain and heart to burn ketones for fuel. This is not written in stone. The less insulin resistant you are, the more carbohydrates you can eat. Some people can consume as many as one-hundred fifty grams of carbohydrates a day and still efficiently use ketones for fuel. Ketogenic diets of short duration show little benefit, and this “cheating” resets the time the body needs to adapt and build the enzymes needed to burn fat efficiently and induce ketosis.

As you lower your carbohydrate intake, you begin a process of re-training your body to burn stored fat instead of carbohydrates for fuel. Normally, it takes from one to three weeks for the body to adjust the

A study cited in the American Diabetes Foundation's publication Diabetes Care showed that taking a tablespoon of apple cider vinegar in water before meals significantly increased insulin sensitivity and dramatically reduced the insulin and glucose spikes that occur after meals.

—Johnston, C.S., Kim, C.M., Buller, A.J., *Diabetes Care*, January 27, 2004: 281-282

new lower level of carbohydrate intake, and build the enzymes needed to burn stored fat.

Meanwhile, during this adjustment phase, your pancreas is still secreting enough insulin for the older, higher level of carbohydrate consumption. And remember, because insulin levels are high, the body is dependent on carbohydrate for fuel, since stored fat can't be accessed.

So your body hums along with a lower carbohydrate intake for a couple of days without any issues, because it can tap into the stored carbohydrate (glycogen) in your liver and muscles. However, eventually the glycogen runs out, more insulin is secreted than actually needed, and a couple of hours later, you have a severe episode of hypoglycemia.

It works like this: Your body perceives that your blood glucose is too low, and starts evasive tactics to get that sugar from somewhere. It needs fuel now! So the body pumps out adrenaline to tell the liver to break down some protein into glucose quickly and dump it in the blood stream. The adrenaline then causes the symptoms that are associated with hypoglycemia: heart palpitations or fibrillation; dizziness; light-headedness; sweating; headaches; nervousness; irritability; shaking and tremors; flushing; craving for sweets; intense hunger; nausea; vomiting; panic attack; numbness/coldness in the extremities; fatigue and shakiness for hours afterwards.

Generally, drinking or eating something that is high in carbohydrate, like orange juice or candy, relieves the majority of the symptoms after about fifteen minutes. There may be some residual fatigue and shakiness for a time afterwards.

In my experience, two to four glucose tablets are an easier and faster way to relieve the symptoms. At the start of a ketogenic diet, I highly recommend buying some glucose tablets or glucose drinks and carrying them around with you. They are available at most discount stores in the diabetic supplies section.

How to Avoid Reactive Hypoglycemia

In the short term, when first starting a low-carbohydrate diet, eating more frequently—say every three hours or so may help. Long term, the best way to avoid reactive hypoglycemia is to permanently reduce the amount of carbohydrate that you eat on a daily basis.

This strategy will eventually lower your blood sugar and circulating insulin. Once insulin returns to normal levels, your body can then access its fat stores, and quickly switch over to burning fat for fuel when you go without a meal or two.

During the first phases of eating a lower carbohydrate ketogenic diet, it's a good idea to make sure you eat every three to four hours. Until you can retrain your body to burn fat, don't try to go for more than four hours without food. Paradoxically, some people who experience chronic hypoglycemic reactions report that waiting five to six hours before the next meal actually helps

reduce the reactions.

Be aware that mainstream physicians aren't generally knowledgeable about this condition because it is rooted in nutritional causes. Doctors aren't taught about the power of nutrition, and so they may minimize your concerns about it. But if you are having these reactions, it indicates you are becoming insulin resistant, and that can mean you

Once insulin returns to normal levels, your body can then access its fat stores, and quickly switch over to burning fat for fuel when you go without a meal or two.



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High-Carbohydrate Foods to Avoid for a Ketogenic Diet

Sugars and sweetened foods: read labels and avoid any foods that contain brown sugar, powdered sugar, cane sugar, corn syrup, sorghum, honey, maple syrup, sucrose, maltose, fructose, glucose, lactose, and the sugar alcohols such as sorbitol, xylitol, mannitol, and maltitol. If it tastes sweet, you should avoid it. This, of course, rules out candy.

All grain (wheat, barley, rye, sorghum, triticale, teff, spelt, rice, etc.) and products made from grain flours: bread, waffles, pancakes, pasta, muffins, cold cereals, hot cereals, bread crumbs, tortillas, crackers, cookies, cakes, pies, pretzels, etc.

Corn products, including cornbread, tamale wrappers, corn chips, grits, polenta, popcorn, tortillas, and cornmeal. Corn is in many foods as high fructose corn syrup (HFCS), thickeners, or preservatives, so read the labels.

Potatoes and products made from them: hash browns, potato chips, tater tots, etc.

Canned soups and stews—most canned products contain hidden starchy thickeners.

Boxed processed foods, because most are high in wheat and sugar and are the worst high-carbohydrate foods to eat because of the added preservatives and fillers.

Starchy vegetables, such as corn, sweet potatoes, lima beans, peas, okra, and artichokes.

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are on a path to diabetes, even if your fasting blood sugar is normal.

If you have severe hypoglycemia when starting a ketogenic diet, you may have to reduce your carbohydrate consumption slowly over a longer period of time to minimize these reactions. Eventually, by continuing to consume a diet lower in high-carbohydrate foods, you should be able to avoid reactive hypoglycemia completely. Δ

This is a slightly edited and revised version of the original article at <http://www.ketogenic-diet-resource.com/reactive-hypoglycemia.html>, and it is reprinted here by permission. See also “Ketogenic Diets: A Key to Excellent Health,” by Ellen Davis, an excellent feature article about ketogenic eating and how ketogenic diets can help reverse inflammation-related diseases, in the July/August 2012 issue of *Well Being Journal*, 1-775-887-1702, www.wellbeingjournal.com.

ELLEN DAVIS is the creator and owner of www.ketogenic-diet-resource.com, a website devoted to sharing information on the health benefits of ketogenic diets. She is an avid supporter of ketogenic diets in all forms, and attributes her devotion to personal experience. She reversed her symptoms of metabolic syndrome, regained excellent health, and lost over 80 pounds by switching from the standard American diet to a whole foods ketogenic diet. She also created www.healthy-eating-politics.com, a website that presents information about the health benefits of whole, nutrient dense foods, and helps dismantle the myth that saturated fat and cholesterol are at the root of heart disease. Ellen lives in Cheyenne, Wyoming, and can be reached via email at ellen.davis.web@gmail.com.

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1. Shoelson, S.E., Lee J, and Goldfine, A.B. Inflammation and Insulin Resistance. *J Clin Invest.* 2006;116(7):1793–1801. doi:10.1172/JCI29069. <http://www.jci.org/articles/view/29069>.

Ron Rosedale, M.D. answers the question, “Is it that important to eat less than 100 gms starch” to make a ketogenic diet work? His answer: “Yes. That is when one gets into ketone burning and when one can get into the calorie restriction, longevity phenotype. The worst diet to be on is high fat along with moderate and sometimes even ‘low’ (as opposed to very low) carbohydrates. If you are going to eat fat, you have to be able to burn it, and as little as 100 gms of non-fiber carbohydrates per day can prevent one from adequately burning fat. According to George Cabill, perhaps the world’s foremost expert on the metabolism of ketones and starvation, 100 gms/day of sugar-forming carbohydrates, i.e., starches, is all it takes to prevent one from burning, and therefore adapting to burning, ketones. As one follows this diet more closely, meaning as little non-fiber carbohydrates as possible, and avoiding excess protein (which is above 1 gm/day/kg lean mass for most), the beneficial returns not only increase, but accelerate.”

—Ron Rosedale, M.D., in “A Conclusion to the ‘Safe Starch’ Debate by Answering Four Questions,” www.drrosedale.com

[However,] coconut oil increases the body’s production of ketones and can raise blood ketone levels to therapeutic levels that can maintain normal brain function and stimulate healing.

—Bruce Fife, N.D., in “Coconut Ketones Fuel Brain Function,” *Well Being Journal*, Vol. 21, No. 5

Carbohydrate Myths

By Ellen Davis

MYTHS ABOUT LOW-CARBOHYDRATE DIETING and specifically ketogenic diets abound in the American collective consciousness.

Myth 1: Carbohydrates are an essential nutrient for good health.

This is a favorite phrase of the American Dietetic Association members. But as much as they like to repeat this, it's just not true scientifically. Essential nutrients are nutrients that your body cannot make, so they have to be obtained on a daily basis from your food sources. There are essential proteins and essential fatty acids, but there is no such thing as an essential carbohydrate. Your body can make all the carbohydrate it needs from protein and the glycerol that is part of fatty acids. However, the fact that carbohydrates aren't essential doesn't mean that everyone should stop eating them completely.

There are people who can tolerate eating large amounts of carbohydrates on a daily basis. However, there are also people who can't.

These people have a low tolerance for carbohydrates, and if they eat large quantities of them, they develop metabolic disorders such as insulin resistance and diabetes.

Some people can eat many carbohydrates without developing any metabolic issues. However, humans can get by without eating carbohydrates and continue to maintain perfect health, because the body can use ketone bodies from fatty acids for fuel, if no carbohydrates are eaten.

Dietitians rely heavily on the *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids* in providing nutritional advice. But even this publication states,



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High-Carbohydrate Foods to Avoid for a Ketogenic Diet

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Beers, as they are made from grain (there are low-carbohydrate beers, but since you want to limit your carbohydrates per day, you have to decide if you want to spend them on beer.)

Dessert wines such as icewine, Beerenauslese, Trockenbeerenauslese, Ruster Ausbruch, Moscato, and Riesling. These are high in sugar.

Non-diet sodas that contain copious amounts of HFCS, which is extremely damaging to your liver.

Milk, especially skim and 1 percent Milk is full of lactose, a type of sugar. Fermented milk products such as cheese and yogurt have less lactose because the bacteria used to ferment the milk eats up all the lactose during the fermentation process.

Fruit of any kind (dried, fresh, frozen): Fruit is high in carbohydrate and fructose. Fructose, even from natural fruit, puts a serious metabolic load on your liver if eaten in large amounts. Berries are the lowest in carbohydrate, so if you have to have something sweet, you could eat one or two strawberries on a ketogenic diet, but the fructose might halt ketosis.

Fruit juices and vegetable juices of any kind.

Beans and lentils, which are high in starch.

Source: www.ketogenic-diet-resource.com

on page 275: “The lower limit of dietary carbohydrate compatible with life apparently is zero, provided that adequate amounts of protein and fat are consumed.”

Myth 2: There’s a danger of vitamin deficiencies with low carbohydrate diets.

In practice, you’ll probably consume more vitamins and minerals on a ketogenic diet than you did on a standard American diet (SAD), as long as you are eating whole foods (i.e., natural fats, meats, and leafy green vegetables) and not packaged, low-carbohydrate junk food.

Myth 3: Ketogenic diets cause your body to go into ketosis, which is dangerous.

Not true. The person who says this is confusing ketosis with ketoacidosis. Ketosis is a normal metabolic pathway for providing fuel when food is scarce. It is controlled by insulin, so unless you are a type 1 diabetic and make no insulin at all, there is very little danger from ketosis. The difference is that ketosis is a controlled metabolic process, and ketoacidosis is a wildly out-of-control metabolic imbalance.

Myth 4: Your kidneys will sustain damage from high protein consumption.

Whenever someone says this, I know they have never researched any of the low-carbohydrate, ketogenic diet literature available. They are just parroting what they’ve heard from someone else. Low-carbohydrate diets, and especially ketogenic diets, are not high-protein diets. They are high-fat diets, with moderate protein consumption. However, if you are healthy and have no prior kidney disease, eating extra protein will not harm your kidneys.

Myth 5: A low-carbohydrate, high-protein diet will cause the body to excrete calcium, and result in osteoporosis.

As stated in Myth 4, a ketogenic diet is not a high-protein diet. It’s a high-fat, moderate protein diet. Regardless of that

fact, protein consumption is essential for good bone health. A paper published in the *American Journal of Clinical Nutrition* titled “Dietary Protein: An Essential Nutrient for Bone Health” indicates that, in addition to calcium in the presence of adequate vitamin D-3,

proteins are a key nutrient in the prevention of osteoporosis. In addition, the paper states that low protein intake is often observed in patients with hip fractures and that a deficiency in dietary protein causes marked deterioration of bone mass and strength. So, in fact, a higher protein intake correlates to stronger,

denser bones. Then what does cause bone loss? There are several suspects: a magnesium deficiency; high fructose consumption; gluten intolerance; and vegetable oil consumption, especially corn oil.

Myth 6: A high-fat ketogenic diet will clog your arteries and give you heart disease.

This, I think is the biggest myth associated with low-carbohydrate ketogenic diets. It’s based on the lie that saturated fat and cholesterol cause arteriosclerosis and heart disease. There has never been any scientific study published, or unpublished, that links cholesterol and saturated fat to heart disease. Shocking, but true. In fact, an *American Journal of Clinical Nutrition* 2010 meta-analysis distinctly destroys any link between heart disease and saturated fat.

A study in the *Journal of the American Medical Association* showed that low-carbohydrate diets actually improve heart disease markers over other types of diets.

A Journal of Nutrition study looks directly at how a ketogenic diet favorably affects blood test

results for heart disease. And a more

recent study from Johns Hopkins University School of Medicine confirms that a higher fat, low-carbohydrate diet is not detrimental to vascular health and results in faster weight loss.

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The authors confirmed that “Low-carbohydrate dieters showed no harmful vascular changes, but also on average dropped 10 pounds in 45 days, compared to an equal number of study participants randomly assigned to a low-fat diet. The low-fat group, whose diets consisted of no more than 30 percent from fat and 55 percent from carbohydrate, took on average nearly a month longer, or 70 days, to lose the same amount of weight.”

In contrast, there are tons of studies showing that a high-carbohydrate diet and elevated blood sugar and insulin are highly associated with inflammatory heart disease. For instance, consider a blood test called the hemoglobin A1c (HbA1c). It’s basically a measure of your average blood sugars for the 3 months preceding the test.

In the EPIC study, the authors looked at the relationship between the Hemoglobin A1c test results and the risk of heart attack. The results were very clear: the higher a person’s HbA1c levels (i.e., the higher the average blood sugar), the higher the risk of heart attack. Δ

For more, including reference citations see www.ketogenic-diet-resource.com/low-carb-dieting.html.

“Low-carbohydrate dieters showed no harmful vascular changes, but also on average dropped 10 pounds in 45 days, compared to an equal number of study participants randomly assigned to a low-fat diet.”

“Egg yolks linked to heart disease” screamed the headlines on Monday 6th August 2012.... The world is now led to believe, thanks to the imagination of some Canadian researchers, that eating egg yolks is going to clog up our arteries. I’d love to hear the process by which the authors think that the post digestion component parts of egg yolks leap out of chylomicrons, find their way into an artery and lay themselves down in the name of plaque.

—Among other researchers, Zoe Harcombe debunking a recent “scientific study” linking egg yolks with carotid plaque, in her article “Egg Yolk Consumption, Carotid Plaque & Bad Science,” at www.zoeharcombe.com

Not all LDL cholesterol is bad. Good or bad depends upon particle size. “Anything that increases triglyceride levels, such as refined carbohydrates, increases the amount of what’s known as ‘small low density LDL’ cholesterol. It appears that these small LDL particles have a much greater atherogenicity—meaning they’ll clog up your artery walls.... In a cohort study of 53,644 men and women over 12 years [researchers found that] replacing 5% of calories from saturated fat with high-glycemic carbohydrates was associated with a whopping 33% increase in heart attack occurrence.”

—Glen Matten, M.Sc., and Aidan Goggins, M.Sc., in The Health Delusion, Hay House, Inc. 2012

Thyroid Disease and Gluten Intolerance

Studies have shown a strong link between autoimmune thyroid disease (AITD) (both Hashimoto’s and Graves’) and gluten intolerance. Chris Kresser, L.Ac., writes, “The molecular structure of gliadin, the protein portion of gluten, closely resembles that of the thyroid gland. When gliadin breaches the protective barrier of the gut, and enters the bloodstream, the immune system tags it for destruction. These antibodies to gliadin also cause the body to attack thyroid tissue.”

Kresser also cautions, “The immune response to gluten can last up to 6 months each time you eat it. This explains why it is critical to eliminate gluten completely from your diet if you have AITD.... Being ‘mostly’ gluten-free isn’t going to cut it. If you’re gluten intolerant, you have to be 100 percent gluten-free” to prevent immune challenges to your thyroid.

“Stool analysis,” says Kresser, is a test that accurately “detects antibodies produced in the digestive tract that aren’t yet escaping into the bloodstream.... Kenneth Fine, a pioneer in the field, has found that up to 35 percent of Americans are gluten intolerant.”

In addition to the stool analysis, “Fine’s lab uses a cheek swab to test for the genes connected with gluten intolerance and celiac disease. People with HLA DQ genes are more likely than the general population to have autoimmune disease, celiac disease or gluten intolerance. Fine’s research shows that more than 80 percent of Americans have one of these gene types.”

Source: “The gluten-thyroid connection” at <http://chriskresser.com/the-gluten-thyroid-connection>